

### 4.3 Overview of International Programs for Identification and Evaluation of Technologies for DOE-EM

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#### Abstract

In 1990, the U.S. Department of Energy and the Russian Ministry of Atomic Energy (MINATOM) established the Joint Coordinating Committee for Environmental Restoration and Waste Management (JCCEM). Since its inception, the JCCEM has supported a number of collaborative projects, involving several hundred scientists from Russian academic and governmental laboratories as well as dozens of scientists from U.S. National Laboratories. These projects cover a wide spectrum of nuclear waste management and disposition issues. More than a dozen workshops and demonstrations on newly developed methods and technologies are conducted annually under JCCEM auspices both in Russia and the United States. The JCCEM has been successful in its mission and has served as a model for other, more recently established joint coordinating committees.

The Joint Coordinating Committee for Environmental Systems (JCCES) between the U.S. DOE Office of Environmental Management and the Polish Institute for Ecology of Industrial Areas (IETU) is in its sixth year. The JCCES currently supports research projects in two main areas: removal or stabilization of organic and inorganic contamination in soils. These activities have emphasized biological technologies (e.g., microbial bioremediation and phytoremediation) that take advantage of the skill and capabilities of the IETU and the environmental conditions present in southern Poland. To date, these projects have been conducted for SCFA in cooperation with the Savannah River Technology Center.

The ultimate goal of these joint coordinating committees is to identify, evaluate and return to the U.S. for deployment, technologies that have the potential to benefit DOE in its environmental remediation needs. The Institute for International Cooperative Environmental Research (IICER) at Florida State University carries out these international programs for DOE. The IICER provides technical coordination, logistical support and project management to the joint coordinating committees.

This presentation will include an overview of these programs and examples of current areas of research and recent deployments.

# Overview of International Programs for Identification and Evaluation of Technologies for DOE-EM

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# **Florida State University**

## **Institute for International Cooperative Environmental Research**

- **Interdisciplinary research arm of FSU**
- **5-year Cooperative Agreement with DOE EM**
- **Responsibility for managing EM  
International Programs**
- **Expertise in toxicology, risk assessment,  
nuclear waste management, engineering,  
hazardous waste management, economics**
- **Technology development & deployment**

# **Joint Coordinating Committee for Environmental Management (JCCEM)**

- **Established 1990 between DOE and Russian Ministry of Atomic Energy (MINATOM)**
- **Goal is to identify, evaluate and return to the U.S. for deployment, technologies that have the potential to benefit DOE EM**
- **Emphasis in the areas of nuclear waste management, radioactive contaminant transport and site characterization**
- **Project management provided by FSU IICER**

# Gamma Locating Device

- NIKIMT, Russian Research and Development Institute of Construction Technology
- Deployed @ INEEL July, 2001
- Untethered remotely operated
- RF transmission of live video, radiation measurement and isotopic identification
- Mounted on INEEL's Irobot ATRV-Jr



# Cobalt Dicarbolide Universal Extraction (UNEX) Technology

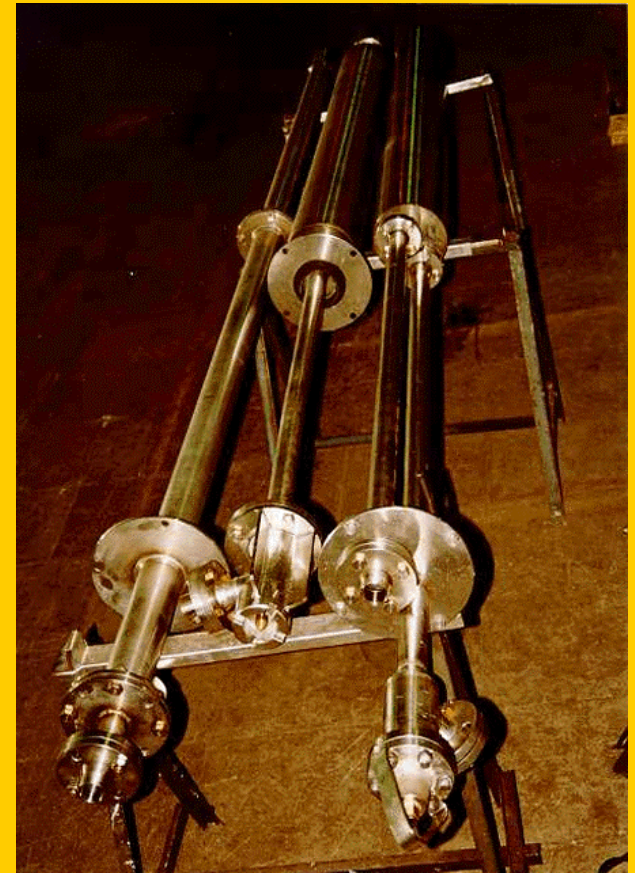
- Khlopin Radium Institute, St. Petersburg, Russia
- Alternate to baseline technology for INEEL
- Removal of long-lived radionuclides from high level waste reduces volume for vitrification
- UNEX removes cesium, strontium, and actinides from acidic waste in a single-step





# Pneumatic Pulsating Pump & Monitor

- Retrieval of high-level waste (HLW) from storage tanks
- Russian Institute for Physical Chemistry
- Mobilizes and retrieves sludge waste using a series of pumps
- Does not require additional liquids
- Demonstrated successfully at Hanford in July of 1997
- Oak Ridge has since procured and deployed (2001) this technology



## **Porous Crystalline Matrix for Stabilizing Actinide Solutions (GUBKA)**

- **Developed by a consortium of Russian research institutes**
- **Manufactured from coal power plant fly ash**
- **Used to stabilize actinide solutions at ambient temperature**
- **Laboratory tests at Fernald and INEEL to stabilize laboratory waste solutions containing both hazardous and radioactive components**



# **Contaminant Transport and Site Characterization Modeling Activities**

- **Validate contaminant transport models for DOE sites with extensive Russian databases**
- **Mayak project**
  - extensive model of the Mayak site recently adapted to the Hanford site
- **Tomsk project**
  - evaluate the safety of deep injection and the effectiveness of proposed monitoring.
- **Vadose zone**
  - Evaluate predictive power of vadose zone contaminant transport modeling and monitoring technologies

# **Joint Coordinating Committee for Environmental Systems (JCCES)**

- **Established 1995 between DOE and Polish Institute for Ecology of Industrial Areas (IETU)**
- **Goal is to identify, evaluate and return to the U.S. for deployment, technologies that have the potential to benefit DOE EM**
- **Emphasis in the area of biological remediation of subsurface contaminants**
- **Project management provided by FSU IICER**

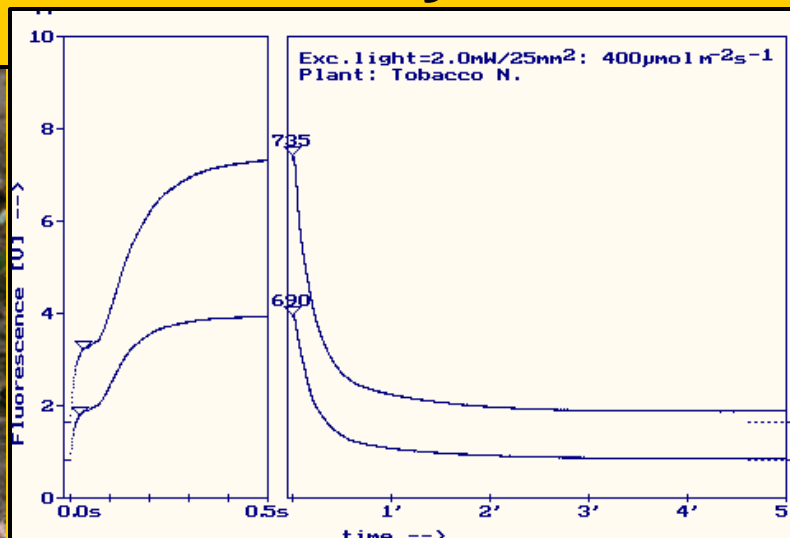
# Bioreactor at SRS

- Polish expertise in bioremediation or organic contaminants in soil
- Developed SRTC concept for portable bioreactor
- Ready to treat mixed waste soils at SRS



# Chlorophyll Fluorometer

- Developed by Technical University of Budapest
- Measures chlorophyll fluorescence as a function of plant stress
- Correlates well with uptake of some compounds
- Applicable to surveys for stressed vegetation





# Phytoremediation deployment

- Phytoremediation of lead from soil
- Applications include abandoned firing ranges
- Polish technology addresses large areas of low to moderate contamination
- Treatability studies at SRS to begin in FY02



# **Other JCCES activities**

- **Technologies for stabilization & removal of mercury from soil (Oak Ridge)**
- **Approaches for management and reuse of coal fly ash (SRS)**
- **Bioremediation of chlorinated solvents (IDC)**



**Thank you**

